Incident Prevention Manual

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INTRODUCTION

The reduction in workplace incidents begins with management's written commitment to incident prevention objectives. To achieve these objectives, this safety policy, with procedures, is distributed through the supervisory level to all personnel involved in overall operations. Although it is necessary to adhere to the safety policy at all times, it should be understood that outstanding safety performance can only be achieved when all personnel maintain an enthusiastic attitude concerning safety and incident prevention during the completion of every task. With the idea that people can do almost anything if they want to do it badly enough, it always follows that attitudes govern actions. We must all attempt to let our actions speak for us by setting the right example for our peers.

This safety policy is not intended to be committed to memory in its entirety. Rather, it is a "framework" or guide through which we improve our efficiency and safety during production. With a consistent effort to learn, practice, and enforce these procedures, safety will become an integral part of our operation.

Regards,

SAFETY MANAGER RESPONSIBILITIES

The Safety Manager is responsible for assisting and guiding management in the formulation of sound safety policy and procedures. The Safety Manager is accountable for stimulating acceptance of sound safety practices, development of an attitude of safety-mindedness, and active participation in all safety activities by all employees of the company.

Specific duties of the Safety Manager includes:

- **collection, analysis, and distribution of data on incidents for the purpose of corrective action and to further understand various safety problems.**
- **consultation with plant managers on the application and implementation of safety procedures and practices.**
- **detecting unsafe working conditions and practices through self inspections of every plant, and making effective recommendations for correction.**
- **maintaining a continuing educational and safety promotional program for all employees.**
- **establishing an effective system for measuring safety performance and maintaining an effective system for reporting and record keeping of all accidents and incidents.**
- **to keep in touch with new developments in the field of incident and fire prevention.**
- **to interpret laws, directives, and codes dealing with incident prevention and fire protection.**
- **investigate serious incidents, as well as significant first aid cases.**
- **assist in the review of specifications for new structures, machines, processes, and equipment for compliance with established codes, laws, and safety requirements.**
- **keep management informed of the company wide incident trends.**
- **assist in setting standards for the proper placement of employees with physical limitations.**

- **follow up on the progress of injured employees with the intent of restoring injured workers to pre-injury physical conditions**

through light or modified duty tasks and early return-to-work programs.

- monitoring of medical clinics and treatment facilities to assure quality service and verify that the interests of the company and injured employees are primary.

PLANT MANAGER RESPONSIBILITIES

The Plant Manager is expected to make every effort to continuously improve plant working conditions until every physical hazard is minimized or completely eliminated. The Plant Manager should assume responsibility for all incidents; furnish the incentive for the safety program; and take an active part in carrying out all elements of the safety program.

Specific duties and obligations for administering the safety program include:

- practicing and reinforcing the idea that production and safety are inseparable. Every safety precaution associated with every job task must be strictly complied with. The Plant Manager must understand that incident prevention is as much their responsibility as production or any other phase of their work.
- conducting of safety inspections of equipment and facilities or delegating the safety inspections to responsible employees, and overseeing the inspections to assure that they are conducted thoroughly and effectively.
- summarizing the results of safety meetings, and assuring that appropriate safety topics are discussed.
- to know the monthly incident experience in the plant, and to keep informed of the primary causes of incidents.
- to oversee incident investigations, and the completion of thorough incident investigation reports.
- to be constantly alert for unsafe practices and conditions, and to take corrective action before injuries result.
- to take necessary disciplinary or corrective action for violators of company safety policy and procedures.
- to enforce all safety rules and regulations set forth by safety policy.

- **timely completion of first reports of incidents, and to keep the safety manager aware of lost time incidents.**
- **conducting or overseeing new employee orientation and indoctrination, safety training, and refresher training for all employees as needed.**

FOREMAN RESPONSIBILITIES

The foreman, as an immediate supervisor, is a key person in the safety program because the Foreman is in direct constant contact with all employees in his/her department.

Specific duties and responsibilities of the Foreman include:

- **constant safety inspections of work areas to detect and correct unsafe acts and conditions.**
- **on-going training of employees in safe work practices and procedures.**
- **conducting of safety meetings with all employees in the department.**
- **formal monthly safety inspections of all areas within the department.**
- **completion of thorough, effective incident investigations when such actions are necessary, including "near-hits" incidents.**
- **enforcement of all company safety rules and regulations.**
- **development of good housekeeping and maintenance procedures within the department, with high standards for personal and operational cleanliness.**

EMPLOYEE RESPONSIBILITIES

Each employee has a responsibility for his or her own safety, but likewise has a responsibility to his or her family, fellow workers, the community, and to the employer, by whom he or she is paid. In the performance of duties, the employee is expected to observe safe work practices, as well as instructions relating to the efficient performance of all tasks. The ideal in safe and efficient operations is reached *only* when all employees are safety-conscious and keenly alert mentally and physically.

The employee must:

- **follow all company rules, regulations and policies at all times.**
- **report all incidents and injuries immediately, including "near-hits" which could result in injury or damage to equipment or materials.**
- **submit ideas for safety improvements.**
- **know their exact duties and responsibilities and carry out those duties in the event of an emergency.**
- **report unsafe or careless acts which could cause injury or property damage.**
- **conduct themselves in a mature and responsible manner during the completion of their assigned tasks.**

CHAPTER 1
MANUAL HANDLING PROCEDURES

1-1 GENERAL

Lifting, lowering, pushing, pulling, and carrying of materials and equipment can cause injury if proper procedures are not followed. Injuries typical of material handling include strains, sprains, fractures, contusions, and lacerations. Usually, such injuries involve the lower back, hands, fingers, and arms. Such injuries can be prevented if proper procedures are followed during material handling.

1-2 LIFTING AND CARRYING

When possible, materials should be handled by mechanical means. Mechanical handling aids are provided, and could include rolling tables, two wheel dollies, pallet jacks, die tables, four wheel dollies (or carts), overhead cranes, and forklift trucks. However, on many occasions mechanical means are not available or practical, and manual handling is necessary. The following rules must be followed during lifting:

1. **Inspect materials or equipment to be handled for slivers, jagged or sharp edges, burrs, and rough or slippery surfaces.**
2. **Keep fingers out from under or between loads, and away from pinch and shear points, especially when setting materials down.**
3. **Wipe off greasy, wet, slippery, or dirty objects or materials before trying to handle them.**
4. **Team lifting should be practiced, wherein more than one employee is assigned to a manual handling task which exceeds the physical capabilities of a single employee.**
5. **Practice the six steps to safe lifting. These steps include:**
    - **keep feet parted, one alongside and one behind the object.**
    - **keep back straight, nearly vertical.**
    - **keep your chin tucked in.**
    - **grasp the object with the whole hand.**
    - **tuck the elbows and arms in, and hold the load close to the body.**
    - **keep the body weight directly over the feet.**

6. **Eliminate low lifts (lifts below knuckle height) to prevent lower back injuries. Stage materials a minimum of 30 inches above floor or ground level if possible.**
7. **Eliminate overhead lifts.**
8. **Do not twist while lifting. Move or reposition the feet instead.**
9. **Try to keep the travel distance during carrying to a minimum. Carrying materials excessive distances increases fatigue.**

1-3 MECHANICAL HANDLING AIDS

As previously discussed, mechanical means should be used to handle materials whenever available or practical. When using mechanical means such as dollies, buggies, rolling tables, pallet-jacks, etc., the following rules must be followed:

1. **All equipment must be inspected and kept in good repair.**
2. **Keep feet away from the wheels.**
3. **Keep loads centered and balanced at all times.**
4. **Load only to a height that will allow a clear view ahead.**
5. **Always push a load – never pull.**
6. **Exercise care to prevent hands, arms, and other body parts from being caught between carts or buggies and stationary objects.**
7. **Exercise caution when approaching blind corners.**
8. **Never overload carts or buggies.**
9. **After using the mechanical devices, return them to their proper storage.**

CHAPER 2
HOUSEKEEPING

2-1 GENERAL

Good housekeeping is a very important element of accident prevention, and must be incorporated into all processes, operations, and tasks performed. Operations with poor housekeeping levels always have a higher than normal frequency of accidents. Housekeeping and safety go "hand-in-hand".

2-2 GOOD HOUSEKEEPING TECHNIQUES

1. **Keep scrap wood, cardboard, and metal banding off of floors.**
2. **Always use waste cans for paper, trash, scrap, and debris.**
3. **Properly dispose of empty bottles, wrappers, containers, and paper in lunch rooms and break rooms.**
4. **Keep food and beverage spillage off of floors.**
5. **Grease and oil spillage on floors should be treated with absorbent materials and swept up.**
6. **Leaking containers or drum spigots should be repaired immediately. Drip pans should be used to catch drips from spigots on dispensing drums.**
7. **Solvent soaked rags should not be placed in standard waste cans, due to the possibility of fire from spontaneous combustion.**
8. **All grounds around the perimeter of the building and within operating areas should be kept free of weeds, trash, and other materials which could pose a fire hazard.**

CHAPTER 3
HAND TOOLS

3-1 GENERAL

Because of the widespread use and abuse of hand tools and the severity of many tool injuries, it is important that control of tool accidents be made a part of every safety program. Injuries from the misuse of tools or the use of damaged tools include loss of eyes, puncture wounds, lacerations, broken bones and contusions from slipping tools.

3-2 CARE OF TOOLS

1. **All tools and equipment must be returned to the proper storage area after use. Tools should not be left on machinery or equipment; or on floors or in aisle ways.**
2. **All tools should be kept clean and free of corrosion. Wipe off accumulated grease and dirt. Lubricate moving and adjustable parts to prevent wear and misalignment.**
3. **Keep tool edges free of knicks, burrs, and uneven surfaces. Sharp tools improve accuracy and are safer than dull tools.**
4. **Use oilstones or grindstones for tool sharpening.**
5. **All damaged or worn tools must be promptly removed from service until they are repaired or replaced. All tools that cannot be repaired should be discarded immediately.**
6. **Tools should not be used if they contain cracked or worn jaws, broken tips, split or broken handles, etc.**
7. **Struck tools such as punches or chisels should be dressed immediately when they begin to mushroom.**
8. **Metal cutting tools should have the cutting edge maintained in sharp condition. Each cutting edge should have the correct angle according to its use, and should be finished off smooth with a file.**

3-3 USING TOOLS SAFELY

3-3.1 SCREWDRIVERS

1. **Screwdrivers should not be used as punches, edges, pinch bars, or pries. Screwdrivers should not be struck with hammers.**
2. **Screwdrivers should not have broken handles, bent blades, or dull or twisted tips.**
3. **Parts to be worked on should never be held in the hands. Parts should be placed on a workbench or other flat surface or held in a vise.**
4. **Flat bit screwdrivers should not be used on cross slot screw heads. The appropriate screwdriver must be used for each task.**
5. **Screwdrivers used for electrical work should not have the blades or rivets extending through the handles. Both blade and handle should be insulated except for the tip.**

3-3.2 HAMMERS

1. **Safety glasses or goggles must be worn when hammers are used.**
2. **Hammer blows should always be struck with the striking force parallel. Avoid glancing blows and over/under strikes.**
3. **Never use a hammer to strike another hammer.**
4. **Never use a hammer with a loose or damaged handle.**
5. **Discard any hammer with dents, cracks, chips, mushrooming, etc.**
6. **Ball peen hammers should be used for striking chisels and punches, or for riveting, shaping, and straightening unhardened metal.**
7. **Nail hammers should only be used for driving unhardened common and finished nails and nail sets. Nail hammers should not be used to strike chisels or punches.**

3-3.3 HACK SAWS

1. **All hack saws should have blades securely tightened in frames to keep the blade straight.**
2. **All blades should be installed with the teeth pointed forward.**
3. **Pressure during cutting should be applied on the forward stroke only.**

3-3.4 HAND SNIPS/METAL CUTTING TOOLS

1. **Jaws of snips should be kept tight and well lubricated.**
2. **Never hammer on handles or jaws of snips.**
3. **Safety glasses or goggles must be used when trimming corners or slivers of metal.**
4. **Hand snips should not be used to cut wire or cable.**

3-3.5 CROWBARS AND PRYBARS

1. **Pieces of pipe or iron bars should not be used as substitutes for crowbars or pry bars.**
2. **Crowbars and pry bars must have adequate points or toes to grip objects, with heels to provide pivots or fulcrum points.**
3. **Crowbars and pry bars should not be stored on end. They should always be stored horizontally in a designated storage area.**

3-3.6 WRENCHES

1. **Users of wrenches should always be properly braced to prevent loss of balance in case of slippage of the tool.**
2. **Wrenches should not be ground to change their size or reduce their dimensions.**
3. **The open end of a combination wrench should be used for initial loosening or final tightening. The box end should be used for speed turning of loosened nuts only.**
4. **Never overload the capacity of a wrench by using a pipe extension on the handle or by striking the handle with a hammer.**
5. **Never use a wrench as a hammer.**
6. **Pipe or Stilson wrenches should not be used as Monkey wrenches.**
7. **Keep jaw corrugations on wrenches sharp and clean.**

8. **Wrenches should always be placed on nuts with the jaw opening facing the direction the handle will move. Always pull on wrench handles. Avoid pushing.**

3-3.7 FILES

1. **Always use the proper file for the task.**
2. **The cut should always be on the forward pass of the file.**
3. **When filing small objects, the objects should be clamped securely.**
4. **When teeth become clogged, clean with a file card.**
5. **Do not use files as pry bars or punches.**

3-3.8 PLIERS

1. **Pliers should only be used when no other tools are available for the job.**
2. **Never use pliers as wrenches.**
3. **Jaw corrugations should always be kept sharp and clean.**

3-3.9 BANDING TOOLS

1. **Metal banding tools should be kept in good condition at all times. Ratchet handles should fully engage and lock with minimal slippage.**
2. **Metal banding should be properly inserted into the banding tool.**
3. **Metal banding should not be twisted excessively during tensioning of the band.**
4. **The user should stand to one side of the banding tool at all times, to avoid being struck directly by a broken band.**
5. **The metal banding should be fully crimped before releasing tension on the banding tool.**

CHAPTER 4
POWER TOOLS

4-1 GENERAL

The majority of portable power tool accidents are caused by improper handling and poor maintenance. Typical injuries caused by portable power tools are burns, cuts, and strains. Sources of injury include electric shock, particles in the eyes, and falling tools.

4-2 MAINTENANCE AND STORAGE

1. **All tools should be returned to storage in their designated areas when not in use.**
2. **All worn or damaged power tools must be removed from service and repaired or replaced immediately.**
3. **All power tools must be inspected for defects prior to use.**
4. **All safety guards must be left in place. Guards must not be removed or rendered ineffective.**
5. **All power cords must be checked before using the power tools. The cords must be free of cuts in the insulation or worn or loose plug connections.**
6. **All power cords must be of the 3 conductor type, with a grounding pin, or the power tools must be double insulated.**
7. **All power tools must be unplugged from their electrical source when repairing, changing attachments, or making minor adjustments.**
8. **Do not hang power tools from the power cord or hang power cords over nails, bolts, or sharp edges.**
9. **All power cords must be kept away from oils, hot surfaces, and chemicals.**

4-3 SAFE USE OF POWER TOOLS

1. **Electrical power tools must not be used in wet locations.**
2. **All guards on power tools must remain in place.**
3. **Gloves and safety glasses or goggles must be used at all times.**

4-3.1 PORTABLE CIRCULAR SAWS

1. **All portable circular saws must be equipped with a fixed guard over the upper half of the saw blade, and an automatically retracting guard covering the lower half of the blade. Blocking of the lower guard must never be done.**
2. **All portable circular saws must have "dead-man" controls or a safety trigger switch which shuts the saw off when the switch is released.**
3. **Small pieces being cut must be secured by bench clamps or other means.**
4. **The blades used must be as recommended for the material being cut.**
5. **Saw operators must keep body parts out of the "line-of-cut"**
6. **Saws must not be jammed or crowded into the work. Green or wet material should be cut slowly and with extra caution.**
7. **All materials to be cut should be checked for nails, staples, hard knots, etc.**

4-3.2 SWING CUT SAWS AND RADIAL ARM SAWS

1. **Swing cut-off saws must have the upper half of the saw completely covered. The saw must have a retractable adjusted bottom guard.**
2. **A limit chain or other stopping device must be in place to prevent the saw from swinging beyond the front edge of the table.**
3. **Radial arm saws must have the upper half of the saw blade completely covered.**
4. **Radial arm saws must be equipped with limit stops.**
5. **When ripping, anti-kickback attachments must be in place.**
6. **Body parts must be kept out of the "line-of-cut" at all times.**

4-3.3 ELECTRIC DRILLS

1. **Always provide a pilot hole for the drill point.**
2. **Always select the proper bit for the material being drilled.**
3. **Oversized bits cannot be ground down to fit smaller drill chucks. An adaptor must be used.**
4. **Small pieces of work should be clamped or secured by other acceptable means.**

5. **If a bit is long enough to pass through material, protect against damage or injury on the far side.**
6. **Care should be taken to prevent sleeves and other clothing from being wound around the drill.**
7. **Excessive pressure should not be exerted on the drill bit during drilling. Such actions could result in drill bits breaking.**

4-3.4 BENCH OR PEDESTAL GRINDERS

1. **Bench or pedestal grinders must be equipped with eye shields and hood guards.**
2. **Wheels should be inspected regularly. Wheels should be free of ruts, cracks, chips, etc.**
3. **Only wheels of the proper RPM rating must be used.**
4. **Tool rests must be in place and adjusted within $^{1/8}$ inch of the wheel periphery.**

4-3.5 AIR POWERED TOOLS

1. **Air hoses must be protected from forklifts, heavy foot traffic, etc. Hoses should be hung or suspended from overhead positions.**
2. **All fittings and connections should be maintained in good condition.**
3. **Air hoses showing signs of excessive wear should be replaced immediately.**
4. **Air hoses are not permitted for dusting off employees.**
5. **Air hoses used for cleaning equipment or work areas must be equipped with chip guarding. Air hoses used for such purposes must be limited to 30 PSI.**
6. **Air supply sources must be shut off before disconnecting the tool or air line from the air hose, unless lines are equipped with proper quick disconnects.**
7. **Do not operate any air tool until the tool is against the work piece.**
8. **Never point air actuated tools in the direction of other employees.**
9. **Nail guns and staple guns must be equipped with safety trigger switches to prevent accidental tripping, and must be so**

designed to allow for a single discharge upon activation of the trigger switch.

4-3.6 BAND SAWS

1. **Band saws must be equipped with adjustable blade guards which enclose all exposed portions of the blade, except that portion of the blade needed to accommodate the stock being cut. The maximum length of exposed blade must not be more than $^{3/8}$ inches on either side of the material being cut.**
2. **All wheels, guides, and other power transmission parts must be completely enclosed by guards which prevent access into these moving parts.**
3. **Band saws should be equipped with blade tension control devices. If not so equipped, the operator should inspect the blade for proper tension prior to each operation.**
4. **Band saw blades should be examined prior to use for cracks, broken teeth, and other blade defects which could cause blade breakage.**
5. **If possible, the band saw should be equipped with wheel brakes to prevent coasting and to protect the operator in the event of blade breakage.**
6. **Eye protection must be worn at all times when band saws are used.**

CHAPTER 5
LADDERS

5-1 GENERAL

Ladders present major hazards, and their improper use is the cause of many serious accidents. There are four principal causes of ladder accidents: ascending or descending improperly; failure to secure ladders at top or bottom; structural failure of the ladder itself; and carrying objects in hands while ascending or descending ladders.

5-2 LADDER SAFETY

1. **Ladders must be inspected prior to use, and damaged or defective ladders must be removed from service.**

2. **Ladders must be free of broken rungs, missing rungs, broken or spliced side rails, bent or broken spreader bars, etc.**
3. **Metal ladders are not permitted for use around electrical equipment.**
4. **Ladders cannot be spliced together.**
5. **Ladders must never be used as scaffolding planks.**
6. **Ladder rungs and steps must be kept free of grease, oil, dirt, etc.**
7. **Ladders should never be placed on unstable bases such as boxes, barrels, uneven ground, etc.**
8. **Ladders should not be placed in doorways, passageways, or locations where they can be displaced by other work activities.**
9. **Ladder side rails (straight ladders) must have the side rails extending at least 36 inches above the ladder bearing point during use.**
10. **All straight ladders must be tied off at the top to prevent this equipment from sliding with employees during use.**
11. **Ladder pitch should be no more than ¼ the ladder length.**
12. **Step ladders must not be used as straight ladders.**
13. **Step ladders must have the spreader bars locked in place prior to use.**
14. **The top step of a step ladder should never be used.**
15. **No more than one employee is permitted on a ladder.**

CHAPTER 6
OVERHEAD CRANES

6-1 GENERAL

Cranes can be very dangerous when proper procedures for operating this equipment are not followed. Since heavy loads are raised, lowered, and moved, there is a possibility of being struck by loads, or being crushed under falling loads.

6-2 OPERATING RULES

1. **Employees must never walk or work under suspended crane loads.**
2. **Crane controls must be operated smoothly and gradually to avoid abrupt, jerky movements of the load. Slack must be taken from slings and hoisting cables before the load is lifted.**

3. **The crane must be centered over the load before starting the hoist to avoid swinging the load as the lift is started.**
4. **Loads should not be swung by the crane to reach areas not under the crane.**
5. **Crane hoisting cables must be kept vertical. Cranes cannot be used for side pulls.**
6. **Everyone in the immediate area of a crane load must be aware that a load is being hoisted or moved.**
7. **Cranes must not be operated if hoist cables are excessively worn or damaged.**
8. **Before moving a load, all slings, chains, or other load lifting devices must be fully seated in the bowl of the crane hook.**
9. **All loads must be checked to be certain that the loads are lifted high enough to clear any and all possible obstructions.**
10. **Loads should not be held suspended from cranes not under direct operator control.**
11. **Slings and chains should be removed from crane hooks when not in use, or must be otherwise secured to prevent this equipment from hanging-up.**
12. **Limit switches must not be used to stop a hoist under normal operating conditions.**
13. **Limit switches must not be blocked, adjusted, or disconnected.**
14. **Loads must never be carried over personnel.**
15. **When not in use, crane hooks must be elevated above head height, a minimum of seven feet or more above floor level, to prevent employees from striking heads on crane hooks or blocks.**
16. **Pendent controls must not be released in such a way that they could swing and strike other employees.**
17. **Gantry crane trolley wheels must be protected by sweeps or other acceptable guards to prevent crushing of employees' feet.**
18. **Gantry cranes must be equipped with audible alarms and flash or strobe lights. These alarm devices must function at all times when the gantry crane is in motion.**
19. **Gantry crane operators must never extend any body parts beyond the confines of the crane cab.**

20. **Positive stops or limiting devices must be in place on all cranes or hoists operating on rails, tracks, or trolleys, to prevent overrunning.**
21. **Limit devices should operate on a normally closed circuit.**
22. **Hoisting ropes should be of a recommended construction for crane use. The rated load divided by the number of parts of rope should never exceed 20 percent of the nominal breaking strength of the rope.**
23. **Lifts must never be attempted beyond the rated load capacity of the crane.**
24. **On all capacity or near-capacity loads, the hoist brakes should be tested by returning the crane controls to the "off" position after raising the load a few inches above floor level.**

CHAPTER 7
RIGGING-SLINGS, CHAINS, WIRE ROPES

7-1 GENERAL

Slings, chains, and other hoisting equipment is subject to frequent usage under heavy stress requirements. Such equipment must be maintained in good condition and must be used properly to prevent falling loads from causing serious injury or death.

7-2 MAINTENANCE AND INSPECTION

7-2.1 WIRE ROPES AND HOIST CABLES

1. **Cables or wire ropes showing excessive wear on the crown or outside wires from contact with sheaves or drums should be replaced.**

2. **Corrosion pitting of interior wires is highly dangerous. Such damage demands immediate replacement.**
3. **Cables or wire ropes with kinks must be replaced.**
4. **Fatigue indicated by square types of wire end fracture is caused by bending stresses, whipping, vibration, pounding, and torsion. Such ropes or cables must be replaced.**
5. **Cables or ropes with dried-out lubrication should be replaced.**
6. **Excessive fraying of ropes or cables should result in immediate replacement.**

7-2.2 CHAINS

1. **Chains should be replaced if links are bent.**
2. **Chains should be replaced if there are visible cracks in weld areas, shoulders, or other link sections.**
3. **Chains should be replaced if transverse nicks or gouges are present.**
4. **Extreme wear on bearing surfaces indicates a weakened condition. Chains showing such defects should be replaced.**
5. **Chains with corrosion pits should be replaced.**
6. **Proof coil chain (common hardware chain) must never be used for hoisting materials.**
7. **Permanent identification tags attached by the manufacturer must never be removed.**
8. **All chains should be tagged with "in service" date, and should be automatically discarded regardless of condition after five years of service.**

7-2.3 SLINGS

1. **Slings showing excessive abrasive wear on webbing should be replaced.**
2. **Significant cuts, tears, snags, and punctures decrease the safety factor of the sling, and justify replacement.**
3. **Slings with worn or broken stitches at lap points should be replaced.**
4. **Slings with knots, burns, charring, or weld spatter damage must be replaced.**
5. **All slings with acid, caustic or other chemical damage must be replaced.**

7-3 SAFE USE PROCEDURES

1. **Employees should exercise caution to avoid getting hands caught between slings, chains, and wire ropes, and loads or crane hooks.**
2. **All chains, slings, and ropes must be placed securely in the bowl of the crane hook to prevent this equipment from slipping during loading.**
3. **Slings should not be dragged on the floor or joined by knotting.**
4. **Sharp corners of loads should be protected from cutting the sling webbing.**
5. **Stitch patterns (laps) should not become the bearing points on hooks, around sharp corners, or at choker bearing points.**
6. **Chains should never be spliced by inserting a bolt between the links.**
7. **Never put a strain on a kinked chain. Every link should seat properly as slack is taken up.**
8. **Never use a hammer to force a line over or into a crane hook.**

9. **See that the load is always properly set in the bowl of the crane hook before hoisting and moving.**
10. **Always position chains, slings, wire ropes, etc., such that the load being lifted is properly balanced.**
11. **Exercise caution to assure that arms, hands, legs, etc., are not under loads during lowering and setting into place.**

CHAPTER 8
FORKLIFT TRUCKS

8-1 GENERAL

Forklift trucks are designed to handle heavy loads in confined areas, which increases the possibility of serious injury due to being struck by the equipment or being caught between the forklift truck and stationary objects. Forklift trucks must be operated by authorized, properly trained employees.

8-2 OPERATING SAFTY

1. **All forklift trucks must be operated at a safe speed. Quick starts, jerky stops, and quick turns at excessive speeds are not permitted.**
2. **Only authorized personnel are permitted to operate forklift trucks.**
3. **All loads to be lifted must be positioned securely against the backrest before lifting and transporting loads.**

4. **Whenever possible, the mast must be tilted backwards to keep loads securely against the backrest and to keep traction on the rear wheels.**
5. **When traveling down ramps or inclines, the load must be kept uphill. Drive only in reverse going down, and forwards when going up.**
6. **Know the safe lifting capacity of the forklift truck at all times.**
7. **Never extend a load too far forwards.**
8. **Never tilt the mast forward or vertical when lifting or lowering materials.**
9. **Always make sure loads are centered on the forks prior to lifting to assure a stable load.**
10. **Exercise caution to avoid strains, or injuries to hands and feet when adjusting forks.**
11. **Always inspect a load for loose material or poor balance before handling it.**
12. **Always approach a load slowly and squarely.**
13. **Never drive with an obstructed view. Drive backwards if a load blocks your vision.**
14. **Traveling loads should be carried just high enough to clear the driving surface.**
15. **Obey all traffic and warning signs.**
16. **Sound horn at all openings to buildings, blind corners, crossing aisles, etc., and stop before proceeding.**
17. **Never drive or turn with a load raised.**
18. **Always favor the side of the turn to minimize the hazard of "rear end" swing.**
19. **Always check to assure that dock boards are firmly secured before traveling onto trailers.**
20. **Inspect all trailers and boxcars (if applicable) before entering them with forklift trucks. Be cautious about structural strength of trailer and boxcar floors. Do no drive on structurally unsound or damaged flooring. All trucks and trailers must have brakes set and wheels chocked.**
21. **Always square up a load before stacking. Make sure the stack is stable.**
22. **Standard vehicle traffic regulations apply to forklift truck at all times.**
23. **Forks of trucks must be tilted forward and lowered level with the floor when the forklift is idling or parked.**

24. **Only an approved personnel platform is permitted to be used to hoist employees on a forklift truck. The platform must have guard rails or other approved enclosures on all perimeter sides, and must be securely attached to the truck forks. Employees other than operator are not permitted to ride on forklift trucks.**
25. **Never extend body parts beyond the confines of the lift truck, or into masts, load backrests, etc.**
26. **Never raise a load over an employees head, and never walk under a suspended load.**
27. **Extra caution must always be exercised during inclement weather as handling and braking efficiency is significantly reduced.**

8-3 INSPECTION AND MAINTENANCE

1. **Forklift trucks must be inspected at the beginning of a shift, before the forklift is used.**
2. **Lift and tilt controls must be tested.**
3. **Engine oil levels must be inspected.**
4. **The foot brake must be tested. Only ½ inch of free pedal travel is acceptable. Brake pedals should not feel spongy or drift under pressure.**
5. **Test the emergency brake for defects.**
6. **The truck should be inspected for leaks.**
7. **The horn should be in place and functional at all times.**
8. **Check the steering. Steering should not feel excessively loose and the steering pump should not squeal. Steering knobs are not permitted.**
9. **Check all tires for defects, cuts, imbedded objects, and excessive wear.**

CHAPTER 9
MACHINERY AND EQUIPMENT

9-1 GENERAL

Machinery and equipment, due to the energy sources used to supply power and the many moving parts, present serious hazards. Operators and maintenance employees must follow proper operating and maintenance procedures to prevent serious crushing injuries, lacerations, and amputations.

9-2 BASIC RULES OF SAFETY

1. **Only authorized and properly trained employees are permitted to operate or perform maintenance on machinery and equipment.**
2. **All appropriate safety guards must remain in place. Guards cannot be removed or bypassed.**
3. **All machinery and equipment must contain easily accessible and identifiable emergency stop buttons.**
4. **All machinery and equipment must have an effective path to ground to dissipate electrical fault current which might energize machinery and equipment, to prevent electrical shock.**
5. **All current carrying conductors on machinery and equipment must be properly enclosed in control boxes, conduit, junction boxes, etc.**
6. **All current carrying conductors on machinery and equipment subject to excessive vibration must have flexible mountings and flexible conduit enclosures.**
7. **Employees must never extend body parts (hands, fingers, arms, etc.) into the point of operation or moving parts of machinery or equipment, until the machinery or equipment is shut-off and locked-out.**

8. **All pinch points, roll points, shear points, reciprocating parts, and impact areas must be guarded if these areas are accessible by employees.**
9. **Push sticks, vacuum grippers, pliers, tongs, etc., must be used to place and remove materials in the point of operation of machinery and equipment when these devices are provided.**
10. **All foot pedal activation devices on machinery or equipment must contain shields or covers to prevent accidental activation.**
11. **All machinery and equipment must be locked-out and tagged-out before maintenance, repair, set-up, or adjustment is conducted.**
12. **Any machinery or equipment designed to be stationary or permanently anchored must be securely anchored to the floor to prevent this equipment from moving or falling during operation.**

9-2.1 PRESS BRAKES

1. **Back gauges or material position gauges must be used to position materials in the forming or bending line.**
2. **Dual foot controls or two hand trip buttons, and emergency stop buttons must be in place and functioning properly on all press brakes.**
3. **If two hand restraints or pull backs are in place, they must be used.**
4. **The work piece must be positioned with hands a safe distance from the press brake. If the size of the material requires close distances, work tables should be used in conjunction with vacuum grippers, tongs, or pliers to hold the work piece.**
5. **Adequate clearance for handling stock and work pieces must be maintained at all times around the press brake.**
6. **Care should be taken to assure that back gauges are properly positioned to minimize at all times around the press brake.**
7. **Access to the back of the press brake should be prevented. The rear portion of press brakes should be guarded or barricaded to restrict entry.**
8. **The slide of the press brake must be blocked with safety jacks or other acceptable means if access into the point of operations is required. The equipment must be locked-out and tagged-out at all times prior to maintenance, set-up, repair, etc.**

9-2.2 PUNCH PRESSES

1. **Only authorized and properly trained employees are permitted to operate punch presses.**
2. **Push sticks, vacuum grippers, tongs, etc., must be used to place and retrieve materials if these tools are needed and provided for that particular press.**
3. **All punch press guards must remain in place as equipped.**
4. **Two hand trip controls with emergency stop buttons must be in place on all punch presses.**
5. **Employees must never place hands, fingers, or arms into the point of operation of punch presses, unless all energy sources have been neutralized through lock-out and tag-out of the equipment.**
6. **All flywheels must be fully enclosed by guards if the flywheels are 7 feet or less above floor level.**

9-2.3 METAL SHEARS

1. **Only authorized and properly trained employees can operate metal shears.**
2. **All metal shears must be equipped with point of operation guarding over the knife area. The guard must have a ¼ inch or less opening, or must allow sufficient openings for the stock without allowing fingers into the knife (blade) area.**
3. **All clamping mechanisms or holdowns (if applicable) must operate satisfactorily.**
4. **Work areas must be clear of obstructions at the front and rear of the shear.**
5. **Hands, fingers, or other body parts must never be extended into the point of operation unless all energy sources have been neutralized through lock-out.**
6. **Foot pedals provided for shears must be protected by covers to prevent accidental or inadvertent operation.**

9-2.4 STACKERS

1. **Employees must be properly positioned to prevent being struck by sheets approaching the stacker from the rollformer.**
2. **Employees should not stand at the exit end of the stacker while this equipment is operating.**
3. **Employees should never walk between the exit end of the rollformer and the stacker.**
4. **Gloves should be worn at all times during stacking operations.**

9-2.5 ROLLFORMERS

1. **All guarding must be properly placed to enclose the chain drives and sprockets at all times. Guarding can only be removed by authorized personnel, and then only when all energy sources powering the rollformer have been neutralized through lock-out and tag-out.**
2. **Employees must keep hands out of the point of operation and moving parts at all times.**
3. **Loose clothing, loose jewelry, etc., should not be worn when operating this equipment. Sleeves should not be loose and shirt tails must be tucked in.**
4. **The rollformer must be locked-out and tagged-out during re-gauging of the mill.**
5. **The rollformer must be locked-out and tagged-out when changing profiles or widths on the tooling, unless adjustments can be made without placing body parts in areas where machine movement could cause injury.**
6. **Excessively burred or rough shafts should be reported immediately and corrected.**
7. **Never attempt to cut or remove jammed material from the rollformer unless the machine is locked-out and all energy sources are neutralized.**
8. **Never place any part of the body between the exit end of the rollformer and the conveyor while the machine is running.**

9-2.6 DECOILERS

1. **Never attempt to walk or jump across coil sheets between the decoiler and leveler.**
2. **Keep hands and arms clear of the decoiler and the coil sheets.**
3. **Never stand behind the decoiler, especially during decoiling of the final sheet wraps. The coil sheets can spin off of the decoiler and cause injury.**
4. **Never attempt to overload a decoiler. Know the decoiler capacity at all times.**
5. **Always use extreme caution when removing partial coils from decoilers. This is expecially true of 12 gauge coils. The steel coil sheets can uncoil with great force.**

9-2.7 COIL UPENDERS

1. **Make sure coils are properly placed and centered on upenders to prevent the coils from falling.**
2. **Maintain a safe distance from upenders during operation.**
3. **Use care when walking or standing near upenders. Never stand behind this equipment while it is being operated.**

9-2.8 COIL CADDIES

1. **Make sure coils are securely loaded on caddy at all times.**
2. **Maintain a safe working distance to avoid being struck by the caddy.**
3. **Special attention must be given to the loading of narrow strip widths on caddy. These coils must be loaded in such a way as to prevent them from slipping off the caddy and falling.**

9-2.9 SLITTERS

1. **Maintain a safe working distance from slitter decoilers and recoilers at all times.**
2. **Maintain a safe working distance from the shear when shearing coils for a smooth cut.**
3. **Make sure the slitter is shut off or in the “safe” position and locked-out before setup changes or adjustment to the set up.**

4. **Maintain a safe working distance from slitter scrap. Do not enter areas where slitter scrap is being recoiled unless the machinery is shut off.**

5. **Always shut off and lock-out the slitter before attempting to remove and replace spacers.**
6. **Never extend hands, arms, fingers, or other body parts into roll points, nip points, or other moving parts.**

CHAPTER 10
WELDING AND CUTTING

10-1 GENERAL

Welding and cutting involves the application of extreme heat to join, separate, and cut materials. These processes can cause burns to the skin and eyes, and respiratory irritation if proper safety procedures are not followed.

10-2 SAFE OPERATING PROCEDURES

1. **Cutting and welding operations can only be performed by authorized employees.**
2. **Proper welding gloves with gauntlet protectors must be worn during cutting and welding.**
3. **Filter goggles must be used at all times for cutting.**
4. **A welding hood containing appropriate filter lenses must be worn during all welding operations.**
5. **Adequate ventilation must be provided in all welding and cutting areas.**
6. **All welding cables must be inspected regularly for damaged or cut insulation, and should be free of oil, grease and other chemicals.**
7. **Never change electrodes with bare hands or wet gloves, or when standing on wet floors.**
8. **Employees should never look directly into the arc of a weld during welding operations. Such actions expose the eyes to flash burns,**
9. **Never conduct cutting or welding in areas where flammable and/or combustible materials are located.**
10. **Never cut or weld on a drum which was used for chemical storage.**
11. **Always mark hot metal to keep other employees away from the hot surface following cutting or welding.**

10-3 COMPRESSED GAS CYLINDERS

1. **All oxygen and fuel gas cylinders must be separated by a minimum of 20 feet in storage or by a non-combustible barrier at least 5 feet in height, having a minimum ½ hour fire rating.**
2. **All cylinders must be chained in an upright position to keep them from falling over.**
3. **Valve protective caps must be in place when cylinders are not being used.**
4. **Always "crack" cylinder valves to clear the valves of dust or dirt before making connections.**
5. **Use regulators and pressure gauges only with gases for which they are intended.**
6. **Do not attempt to repair or alter cylinders, valves, or attachments.**
7. **Do not attempt to stop a leak between the cylinder and regulator by tightening the union nut.**
8. **Leaking fuel gas cylinders must be carefully moved outdoors, away from any ignition sources, and the supplier should be immediately notified.**
9. **All acetylene cylinders must have a red line pressure gauge with the red line starting at 15 PSI.**
10. **Cylinders should never be stored in a horizontal position.**
11. **Cylinders should only be moved and transported with appropriate mechanical means. Manual lifting and carrying of cylinders should be avoided.**
12. **When using mechanical means to lift and transport cylinders, the cylinders should be adequately secured to the mechanical handling equipment to prevent the cylinders from falling.**
13. **Cylinders handled with cranes must be placed in cradle slings or on suitable platforms.**
14. **If it is necessary to manually move or reposition cylinders, the cylinders must be rolled on their bottom edge, and never dragged.**
15. **Do not use cylinders for rollers, supports, or for any other reasons other than the purpose for which they are intended, which is to contain gas.**

CHAPTER 11
STORAGE OF MATERIALS

11-1 GENERAL

Large amounts of material must be stored in such a way as to prevent restrictions in work flow, and to assure safe travel throughout the plant. Improperly stored materials can cause injury, and damage to the materials or the structure. Improperly placed materials can present tripping hazards, and restrict normal production.

11-2 COIL STORAGE

1. **All coils must be kept in their designated storage areas at all times.**
2. **Narrow coils must be stored flat to prevent them from falling over and striking employees.**
3. **Coils should be chocked or otherwise placed to prevent them from rolling or being knocked over.**
4. **Coils should not be stacked to excessive heights, and should be stacked so as to be stable and balanced at all times.**
5. **Coils should be arranged and balanced to provide easy access without exposing employees to caught in, under, or between injuries during rigging and hoisting.**
6. **Metal banding around coils should be clinched or trimmed to prevent the banding from extending into aisleways.**
7. **Scrap wood, wood blocks, and pallets should be kept out of work areas and aisleways.**

11-3 FINISHED COMPONENT STORAGE

1. **All finished components should be properly banded and otherwise secured, and should be stacked in a stable and balanced manner.**
2. **All bundles should be separated properly when stacked to allow for rigging and hoisting by crane or forklift truck. Sheet products should have banding installed around wood spacer blocks at the ends and along appropriate intermediate points.**
3. **All finished products must be stored in the designated areas, within the painted concrete lines separating storage areas from**

aisleways. Products in storage should not extend into aisleways or work areas.

4. **Stored products should not be stacked to excessive heights.**
5. **Metal banding should be clinched or trimmed to minimize sharp edges, and to prevent the banding from extending into aisleways.**
6. **Products must not be stacked in such a way as to prevent access to fire extinguishers, electrical disconnects or switches, or other such equipment or facilities.**

CHAPTER 12
TRAILER LOADING/UNLOADING

12-1 GENERAL

Tasks involving loading and unloading of trucks and trailers present many hazards. These hazards include falls from trailers, falling materials, and "struck-by" hazards involving load tie-down devices under tension and moving crane loads.

12-2 BASIC RULES OF SAFETY

1. **Access to and from trailers should be made using trailer ladders only.**
2. **Never dismount trailers by jumping from trailer beds to ground level.**
3. **Always use extra caution during inclement weather to avoid falling on wet or slippery surfaces.**
4. **Always visually inspect trailer and truck beds to assure that these surfaces are structurally sound and free of tripping hazards.**
5. **Never load a truck or trailer if the loading surface is structurally unsound and not capable of supporting a load safely.**
6. **During the handling of tarps, always use extreme caution when walking along side rails and trailer edges.**
7. **Always maintain visual and audible contact with loaders on trailers when hoisting and setting loads using cranes.**
8. **Always keep customers, outside drivers, and visitors away from work areas where loading is taking place to assure their safety.**
9. **After materials are properly placed, always make sure the load handling devices are unhooked and clear of the materials, to avoid pulling the materials off of trailers.**
10. **Always inspect all load lifting and tie-down devices prior to use to assure that this equipment is in good working condition. Take damaged and defective equipment out of service immediately.**
11. **When tightening or loosening boomers, always assure that the cheater pipe is fully engaged with the boomer to prevent slippage.**
12. **When tightening and loosening boomers, work from the ground level whenever possible.**

13. **Always attempt to keep your body out of the direct path of the boomer and cheater pipe during tightening or loosening, to prevent being struck by this equipment if there is slippage, or the equipment fails.**
14. **Always maintain stable footing and balance during boomer tensioning and loosening in case of slippage, especially if such tasks are performed while on trailers.**
15. **When using standing seam racks, always attempt to handle them with mechanical means to prevent strains and other overexertion injuries.**
16. **Never use cracked standing seam racks. Always inspect the racks for stress fractures, excessive corrosion, pitting, etc., prior to use.**
17. **Trailers having loose ratchets should always have the bolts on the ratchets wrench tight after loading.**
18. **Always use cardboard angles on sharp corners and edges to assure that strapping stays secure.**
19. **When loading requires standing on stacked materials, avoid standing on unstable or light gauge materials which could shift or create loss of balance. Materials must always be stacked to create a stable base.**
20. **Vehicles should not be loaded if it is obvious that the vehicle is not suitable to transport the material, or if the materials to be loaded are obviously in excess of the safe load weight capacity of the vehicle. The safety of the customer and/or other vehicles should be considered a priority.**
21. **Vehicles in loading/unloading bays should have the motors turned off if the exhaust fumes become highly unpleasant or noxious to plant employees.**

CHAPTER 13
PERSONAL PROTECTIVE EQUIPMENT

13-1 GENERAL

Although minimizing or eliminating hazards through engineering means is the most effective method of preventing injuries, it is sometimes necessary to require the use of personal protective equipment to minimize the potential for injury. Such equipment as safety shoes/boots, gloves, eye and hearing protection, and respiratory protection can be an effective means of eliminating injury if used consistently and properly.

13-2 GLOVES

1. **All employees working within the plant are required to use the gloves provided at all times. The only exception to this rule includes operations which require working in the close proximity to moving parts or equipment, where there is a high probability of being caught in moving parts if gloves are used. Exceptions can only be granted through direct permission by the Plant Manager.**
2. **Gloves must be maintained in good condition. Normal wear and tear is expected. However, gloves must not be defaced or modified in any way. The fingerstalls of gloves must not be cut to allow fingers to extend from any part of the glove. Glove cuffs must not be cut or rolled-up.**
3. **Gloves issued to each employee are the responsibility of that employee. When gloves become excessively worn or holes or cuts appear, the old gloves must be turned in to receive new gloves.**
4. **Gloves should not be placed in areas of excessive heat, or exposed to excessive moisture.**
5. **Standard Nitrile lined gloves are not designed for the handling of chemical substances or for welding or electrical work.**
6. **Neoprene, Impervious gloves, Butyl gloves, or other chemical/solvent gloves should be worn when handling solvents or other chemicals.**

7. **When employees are exposed to electrical equipment, voltage rated rubber gloves with leather protectors must be worn when appropriate.**
8. **Only flame retardant leather or chrome leather gloves with gauntlets should be used for torch cutting and welding operations.**
9. **Employees who experience discomfort while wearing gloves, or are uncertain concerning when gloves are required, should contact the Plant Manager before commencing with work activities.**

13-3 PROTECTIVE FOOTWEAR

1. **All employees whose regular occupations are in the plant are required to wear approved safety shoes or boots at all times.**
2. **Athletic shoes, dress shoes, and all other non-safety footwear is prohibited for plant personnel.**
3. **Protective footwear with metatarsal guards are not permitted unless direct approval is given by the Plant Manager.**

13-4 HEAD PROTECTION

1. **Employees are not required to wear hard hats or bump caps unless this equipment is specified and provided for certain activities.**
2. **Cold weather headwear is permissible as long as the headwear does not increase the hazards of being caught in or on machinery and equipment, and does not interfere with sight or hearing.**

13-5 EYE PROTECTION

1. **Safety glasses are required of all plant employees when handling metal banding.**
2. **Safety glasses are required at all times when using nail guns, staple guns, or air actuated tools.**
3. **Safety glasses are required for all employees in the trim shop when they engage in tasks involving the use of hammers, punches, or any other "struck" tools. The trimming of sharp metal edges or pieces with tin snips also requires the use of safety glasses.**
4. **Safety glasses are required for forklift truck operators when windy conditions exist which could cause dust or debris to enter the eyes.**

5. **Safety goggles are required during the use of portable power saws, circular saws, radial arm saws, drills and any operations involving grinding.**
6. **Safety goggles are required during the handling of all chemical substances.**
7. **Full face shields are required during the handling of caustics and corrosives.**
8. **Flash goggles with a minimum 3.0 shade rating are required during welding operations.**
9. **Safety glasses are required for overhead work when the potential exists for dislodged dust or debris.**

13-6 HEARING PROTECTION DEVICES

1. **Employees identified as being overexposed to noise must wear the hearing protection provided at all times.**
2. **All employees entering plant areas identified as noise overexposure areas must wear hearing protection.**
3. **Hearing protection devices cannot be purchased until the hearing protection is approved by the Safety Manager and the Vice-President of Manufacturing. Different types of hearing protection devices are intended for specific noise levels. The protection provided must have an NRR rating adequate for the noise levels present.**
4. **Difficulties with proper fit of hearing protection devices should be immediately reported to the Plant Manager.**

13-7 RESPIRATORY PROTECTION

1. **Employees exposed to operations generating excessive dusts must wear particle masks or dust respirators.**
2. **Employees performing spray applications of solvents or other coatings must wear approved organic cartridge filter respirators with prefilters. Such protection must be approved by the Safety Manager and the Vice-President of Manufacturing.**

3. **Airline hoods, air supplied respirators, and self contained breathing apparatus are not permitted unless such equipment is approved by the Safety Manager and Vice-President of Manufcturing.**

13-8 GENERAL DRESS CODE

1. **Shorts are not permitted within plant areas.**
2. **Long pants with excessive holes and tears are not permitted.**
3. **Shirt tails must be tucked in at all times to prevent this clothing from snagging on materials or equipment, or being caught in the moving parts of machinery.**
4. **Hair must be maintained an acceptable length.**
5. **Employees must wear socks at all times.**
6. **Open-toed shoes, sandals, or flip-flops are not authorized in the manufacturing plant at any time.**
7. **Shirts must be worn at all times.**
8. **Back support belts or weight belts are not permitted to be worn unless such equipment is recommended by a physician. The use of such equipment must be approved by the Safety Manager and the Vice-President of Manufacturing.**
9. **It is not recommended that jewelry such as rings, necklaces, earrings, etc., be worn by plant employees. Such items are subject to damage, and increase the potential for "caught in" injury. The company will not be responsible for damage sustained to jewelry and related apparel during employment.**

CHAPTER 14
ELECTRICAL

14-1 GENERAL

Properly used, electricity is a very safe and useful form of energy. However, failure to take proper safety precautions during its use can cause serious injury, death, and property damage. Specific hazards involving electricity include electrocution, severe burns, and fires.

14-2 ENCLOSURE OF ELECTRICAL APPARATUS

1. **All electrical distribution and control devices such as raceways, breaker boxes, disconnect boxes, switch panels, etc., must contain covers which fully enclose all conductors**

and related devices at all times except during required maintenance or repair.

2. All metal framework and metal parts for electrical distribution and control devices must be properly grounded to safety dissipate fault current.
3. Any knockout openings in junction boxes, pull boxes, disconnect enclosures, etc., must be sealed at all times by plugs or other approved devices.
4. All junction boxes, pull boxes, and similar devices for containment of wiring must be fully enclosed at all times with securely fastened covers.
5. Knife switches (if applicable) must be enclosed in grounded metal cabinets having control levers that operate outside of the cabinets.
6. All electrical outlets must have face plates in place at all times. Face plates must be in good condition, free of cracks and chips.
7. Permanent electrical conductors must be enclosed in conduit at all times.
8. Electrical conductors subject to vibration must be enclosed in flexible conduit with flexible housings and connectors.

14-3 FUSES AND CIRCUIT BREAKERS

1. Fuses and circuit breakers must function continuously to open a circuit automatically in the event of excessive current flow from accidental ground, short circuit, or overload.
2. Before any fuses are replaced, the circuit must be locked-out and a determination must be made as to the reason for the short circuit or overload.
3. Blown fuses must be replaced by others of the same size and type.
4. Fuses must never be inserted into live circuits.
5. Fuse pullers should be used to remove and replace fuses.
6. Plug fuses cannot be used on circuits which exceed 30 amperes and 150 volts.

14-4 EXTENSION AND POWER CORDS

1. **All extension and flexible power cords must be of the three (3) conductor type with plug connections containing a grounding pin and two (2) parallel polarized blades.**
2. **Three (3) conductor cords with grounds are not required if a tool is double insulated.**
3. **Cords must be securely fastened to termination points on tools, equipment, and plug-ends, with no visible breaks in the insulation at termination points.**
4. **Cords subject to excessive strain or tension must be equipped with strain relief devices.**
5. **Cords must be free of cracks, frays, breaks in the insulation, and splices. Such cords should be discarded and replaced immediately.**
6. **Extension cords must not be used as fixed or permanent wiring, and must not be run through holes in walls, ceilings, or floors.**
7. **Excessive kinking or bending of cords should be avoided, to prevent wire strands from being broken and extending through the cord insulation.**
8. **Cords should not be strung along areas where there is heavy vehicular or foot traffic, to prevent damage to cords.**
9. **Cords should not be subjected to excessive heat, cold, or corrosive materials, and should be kept away from oils and solvents which could deteriorate the insulation.**

14-5 GENERAL RULES

1. **Only qualified maintenance personnel are permitted to work on electrical equipment or devices.**
2. **Never attempt to touch electrical wiring. Report exposed wiring or electrical defects immediately.**
3. **Never open panel covers or doors to electrical equipment, and never remove cover plates from conductor housings unless qualified and specifically authorized to do so. These tasks are to be performed by qualified maintenance personnel only.**
4. **Never operate electrical power tools in areas of excessive moisture or standing water.**
5. **Always keep areas in the immediate vicinity of electrical equipment clear of materials and tools.**
6. **Never attempt to work on electrical equipment until the equipment is tested with appropriate devices such as neon**

receptacle testers, ground loop impedance testers, ammeters, or voltmeters, to assure that the circuit has been locked-out.

CHAPTER 15
LOCKOUT/TAGOUT

15-1 INTRODUCTION

Thousands of employees are seriously injured each year by sudden, unexpected machine movements and by energy sources which power this machinery. These injuries usually occur during maintenance, adjustment, set-up, and repair on machinery and moving parts which should have been locked-out and tagged-out prior to commencing with the activity or operation. The primary types of injuries occurring include crushing of body parts, severe lacerations, and amputations.

15-2 GENERAL RULES

1. **All machinery and equipment must be locked-out and tagged-out at all times prior to service, maintenance, adjustment, or set-up, if there is the possibility for injury due to unexpected or accidental start-up or contact with stored primary or secondary energy sources.**
2. **Lockout and tagout of equipment requires Zero Mechanical State (ZMS), wherein all energy sources are dissipated, blocked, or otherwise neutralized. Energy sources which must be controlled include electricity, pneumatics, hydraulics, gases, energy stored in springs, suspended parts, etc.**
3. **All energy isolating devices used to achieve ZMS must physically prevent the transmission or release of energy to the machinery or equipment. Approved energy isolation devices will include:**
    - **Manually operated electrical circuit breakers**
    - **Levered fusible disconnect switches (LFD)**
    - **Levered unfused disconnects (LUD)**

- **Manually operated switches by which all conductors of a circuit can be disconnected from all ungrounded supply conductors**
- **Slide gates**
- **Slip blinds**
- **Line valves**
- **Safety jacks or blocks**

4. **Push button controls, selector switches, limit switches, interlocked guards and gates, and other such control circuit type devices are not permitted to be used as a means of achieving lockout of equipment and machinery.**
5. **Lockouts must be performed using multiple lock hasps with padlocks and individually assigned keys.**
6. **Tagouts are not permitted as a substitute for lockouts if the equipment or machinery is capable of being locked-out. The use of tagouts as a substitute for lockouts is only permitted if the equipment is not capable of being locked-out, and then only when the plant manager has evaluated the situation and has given permission to do so.**
7. **Machinery such as punch presses, press brakes, and shears must have all suspended parts such as slides, rams, guides, and blades blocked when in an elevated position, in addition to disconnect and lockout of primary and secondary energy sources, prior to working between the suspended parts. Blocking of suspended parts must be achieved by safety jacks or other blocking devices which are structurally capable of withstanding the force of an accidental stroke or downward motion.**
8. **Only authorized employees are permitted to implement lockout and tagout on machinery and equipment.**

15-3 LOCKOUT AND TAGOUT ACTIVITIES

1. **The Energy Source Control Chart must be used to identify and locate the appropriate energy isolation devices during lockout.**
2. **All affected employees in the areas of lockout and tagout activities must be notified and cleared of the immediate areas prior to commencing with lockout and tagout.**
3. **The equipment to be locked-out must be turned off by the normal shut down method prior to lockout and tagout.**

4. **Each authorized employee involved in lockout must install his or her own lock and tag device. Padlocks and keys cannot be shared.**
5. **Only the employee who installed a lockout and tagout device is permitted to remove it, unless unusual circumstances such as absence or emergency necessitate the need for removal of the device by an individual other than the employee who installed it. In such situations, approval for removal of the device can only be granted by the Plant Manager.**
6. **All equipment which has been locked-out must be test operated to assure lockout prior to commencing with service or repair activities.**
7. **Following completion of lockout activities, the affected employees must be notified and the area must be kept cleared until all required activities are performed.**
8. **Prior to set-up, all equipment must be inspected to assure that all guards are properly installed, and tools and loose parts have been removed and properly stored.**

15-4 ADDITIONAL INFORMATION

The Lockout/Tagout Master Binder provides additional information such as Energy Source Control Charts, Authorized and Affected Employee Registers, and written policy relating to lockout and tagout activities. All plant employees must be familiar with the contents of the binder. New plant employees must complete the Lockout/Tagout Training Program prior to starting work. All plant employees must receive annual refresher training on lockout and tagout procedures.

CHAPTER 16
HAZARDOUS MATERIALS HANDLING

16-1 INTRODUCTION

Exposure to chemical substances can cause serious injury or death if such substances or materials are improperly used. In addition to adverse health effects such as kidney and lung impairment, heart ailments, burns, and rashes, many substances are flammable and explosive. Adverse health effects and property damage can be avoided if all elements of the Hazard Communication Program are followed at all times.

16-2 HAZARD COMMUNICATION PROGRAM

1. **The written Hazard Communication Program, Chemical Inventory List, Component Inventory, Material Safety Data Sheets (MSDS), and the Hazard Communication Training Program must be filed in the appropriate sections of the Hazard Communication Program Binder.**
2. **Maintenance and upkeep of all elements of the program is the responsibility of the Plant Manager.**
3. **All elements of the Hazard Communication Program must be made accessible to employees at all times.**

16-2.1 MATERIAL SAFETY DATA SHEETS

1. **Material Safety Data Sheets (MSDS) must be on hand for all chemical substances or materials used at the premises.**
2. **MSDS must be made readily accessible to employees during each work shift.**
3. **Employees are required to review MSDS prior to handling any chemical substance or material.**

4. **All safety procedures set forth on the MSDS must be followed by employees, including the use of appropriate personal protective equipment.**
5. **When updated MSDS are received from manufacturers or distributors, the updated MSDS must be filed and the outdated MSDS must be removed.**
6. **MSDS received must be thorough and complete, containing all appropriate sections as mandated by the U.S. Department of Labor. The manufacturer of distributor of the substance in question must be notified immediately if MSDS received are incomplete or inaccurate.**
7. **The Manager of Safety should be contacted when technical questions arise, or when the accuracy of information contained on the MSDS is questioned.**

16-2.2 CHEMICAL INVENTORY LIST

1. **A Hazardous Chemical Inventory List containing all substances used at the premises must be kept on file in the Hazard Communication Program Binder, and must be continuously updated to assure that it is current.**
2. **New chemical substances or materials received must be added to the inventory. Substances or materials which are no longer used must be removed from the inventory.**
3. **The Chemical Inventory List must be used to verify that MSDS are on hand for all substances.**
4. **Materials or substances appearing on the Chemical Inventory List are not required to have MSDS if the substance or material is regulated by the Consumer Product Safety Act (CPSA).**

16-2.3 CONTAINER LABELING

1. **All chemical substances or materials received from manufacturers or distributors must contain appropriate labels.**
2. **All labels must contain the chemical name, hazard warnings, and manufacturer's name and address.**
3. **Containers which have no labels, or labels which are unreadable must have the labels replaced immediately.**
4. **All portable containers for the purpose of end use dispensing must be labeled appropriately to prevent confusion as to the container contents.**
5. **Employees must never remove or deface container labels.**

16-2.4 EMPLOYEE TRAINING

1. **New plant and custodial employees must successfully complete the Hazard Communication Training Program prior to starting work, and must be informed of the exact location of all MSDS for the substances or materials they work with or are exposed to.**
2. **All plant and custodial employees must sign the acknowledgement indicating that they have received training on the Hazard Communication Program. The acknowledgements must be retained on file at the plant premises.**
3. **All plant and custodial employees must receive annual refresher training on the Hazard Communication Program requirements.**

16-3 SPILL PROCEDURES

Whenever a spill or sudden release of a hazardous material or substance occurs, it is necessary to take immediate action to abate the spillage. Otherwise, property damage and employee injury is possible. The following steps should be taken in the event of spillage or leakage of hazardous materials or substances.

1. **The extent of the spillage or leakage must be quickly evaluated to assure that the spill is small and easily handled. A small spill should pose no threat of rapid and massive travel into other work areas.**
2. **The source of leakage or spillage must be determined and corrected to prevent further leakage from occurring. Leaking drums or containers should be quickly patched or plugged and carefully removed to a point of safe distance outside of the building, and the contents of the damaged container should be transferred to another suitable container. If drums or containers are knocked over, the drums or containers should be uprighted.**
3. **If the substance is flammable or combustible, all possible ignition sources must be removed or isolated from the spill or leak area immediately.**

4. **Appropriate absorbent materials should be used to clean up the spill.**
5. **All contaminated absorbent materials are now hazardous wastes, and must be placed in appropriate sealed containers and disposed of in accordance with EPA and state agency regulations by a licensed hazardous waste disposal contractor.**
6. **The MSDS information for spill and leak control, disposal, and personal protective equipment must be followed at all times.**

16-3.1 LARGE SPILL PROCEDURES

1. **For large spills of hazardous substances or materials, all personnel must be evacuated a safe distance from the area immediately.**
2. **A judgment must be made as to whether the spill can be managed and handled by plant personnel. This determination must be made by the Plant Manager.**
3. **Spills of such magnitude that they cannot be safely handled by plant personnel because of the danger of fire, explosion, or toxic vapors must be handled by outside emergency response personnel such as Hazardous Materials Teams or Fire Department personnel.**
4. **For spills handled "in-house", a spill team must be quickly organized to carry out spill abatement and damage control.**
5. **The MSDS must be reviewed to assure that all appropriate personal protective equipment, including clothing and respiratory protection is provided and used.**
6. **All sources of ventilation must be shut-off if the spillage creates the potential for vapor disbursement throughout the facility. Otherwise, general dilution ventilation such as fans should be used to dilute vapors and route them to the exterior of the building.**
7. **All sources of ignition including electrical equipment and machinery must be shut-off to prevent ignition of airborne vapors or gases. Electrical equipment downwind must be shut-off first.**
8. **The source of the spillage or leakage must be detected and corrected, and absorbent socks must be placed around the perimeter edges of the spill to prevent material from traveling to other portions of the structure. If absorbent socks are not available, absorbent material must be poured along the perimeter edges of the spill to form temporary dikes.**

9. **Once the spill has been controlled to prevent travel into adjacent areas, the spilled substances or materials must be cleaned up using absorbent sheeting or blankets, vermiculite, or other types of spill absorbent materials.**
10. **As with all waste substances, the contaminated absorbent must be placed in appropriate sealed containers and disposed of in accordance with EPA and state agency regulations.**
11. **The spill area should not be entered until all vapors have dissipated.**
12. **Phone numbers for emergency response personnel should be posted in the Plant Managers office so as to be readily accessible in an emergency situation.**

CHAPTER 17
WASTE DISPOSAL PROCEDURES

17-1 INTRODUCTION

The proper handling and disposal of waste substances and materials is of great importance to avoid costly physical damage accidents, employee and public injury, environmental damage, and corporate embarrassment. The Resource Conservation and Recovery Act (RCRA) mandated by the Environmental Protection Agency (EPA) regulates hazardous wastes from "cradle to grave". In addition, the EPA allows states the ability to regulate hazardous wastes within state boundaries. All state and federal regulations governing the handling and disposal of hazardous wastes must be complied with at all times.

17-2 STORAGE PROCEDURES

1. **All containers used to store waste substances or materials must be structurally sound. Containers must be free of corrosion, dents, punctures, and cracks.**
2. **All containers of waste substances must be inspected periodically to assure that they are in good condition.**

3. **Whenever possible, all containers should be stored in an area protected from the elements, to prevent weakening of the containers.**
4. **All drums must be properly sealed during storage to prevent the intrusion of rain water, which will cause overflow of the drum contents. Whenever possible, storage drums should be sealed with pressure relief bungs, to allow internal pressure within the drums to dissipate.**
5. **Each different type of waste substance must be confined to storage in separate drums. Each drum containing a particular waste substance must be labeled to prevent possible confusion as to the waste contents.**
6. **Waste substances must not be poured into floor or sink drains.**
7. **Waste substances or materials must never be discarded in trash or scrap dumpsters. This includes contaminated absorbent materials and rags.**
8. **Waste substances or materials cannot be buried or poured into soils, and cannot be burned.**
9. **Volatile and/or flammable wastes should be stored in light colored drums to reflect the suns radiation, and prevent expansion, contraction, and over-pressurization.**

17-3 DISPOSAL PROCEDURES

1. **Each plant generating hazardous waste substances or materials (including used oils) must have these substances or materials removed from the plant premises by a licensed waste disposal contractor.**
2. **The disposal contractor must present evidence of Environmental Impairment Liability (EIL), must be regulated by the EPA, and must be licensed by the state and the EPA.**
3. **Initial (first time) disposal of waste substances requires pre-qualification testing of the waste stream by accepted methods, including Toxicity Characteristics Leaching Procedures (TCLP) prior to removal of the waste substance by a waste disposal contractor. A copy of the Waste Stream Profile must be kept on file at the plant premises.**
4. **A Waste Stream Profile Addendum must be kept on file at the plant premises, and must list all land disposal restrictions.**
5. **Before any waste can be removed from the premises, an EPA identification number must be secured. Application for this**

number can be made using EPA form 8700-12 (Notification of Hazardous Waste Activity).

6. **A Uniform Hazardous Waste Manifest must be generated by the waste disposal contractor. In addition, all necessary state manifest forms must be secured. The manifests must be obtained prior to waste shipment, and must be kept on file at the plant premises.**
7. **All manifest forms must be complete, with the following information included:**
    - **Names, addresses, telephone numbers, and EPA identification numbers of the generator, transporter, and designated receiving facility.**
    - **Descriptions of each waste substance or material generated, including D.O.T. descriptions, EPA waste code numbers, types and quantities of all containers, and additional descriptions as required.**
    - **Special handling instructions.**
    - **Signed certification by the generator attesting to the truth of the information.**
8. **Waste substances must not be held at the plant facility for longer than 90 days. Otherwise, storage facility permits must be obtained.**
9. **All documents must be kept on file indefinitely, with duplicate documentation sent to the corporate office in Houston.**
10. **Hazardous waste (regardless of quantity) must never be transported in company vehicles or by employees.**
11. **Unless the facility has approved means of waste treatment on site, the only disposal options for hazardous wastes will be recycle/reuse or disposal of the wastes by licensed waste disposal contractors.**

CHAPTER 18
FLAMMABLE AND COMBUSTIBLE LIQUIDS

18-1 INTRODUCTION

The proper storage and handling of flammable and combustible liquids is necessary at all times to prevent possible destruction of property, and serious injury or loss of life. Inadequate storage and handling controls can result in flash fires and explosions, thereby posing a serious threat to the life safety of plant personnel and adjacent communities.

18-2 STORAGE PROCEDURES

1. **All flammable and combustible liquids must be stored in areas away from potential sources of ignition. Flammable and combustible liquids cannot be stored or handled around smoking materials, torch cutting, welding, electrical equipment, and other open flame or ignition sources.**
2. **Flammable and combustible liquids must be stored in appropriate containers which are free of structural defects or weaknesses such as cracks, holes, dents, and corrosion.**
3. **Bulk quantities of flammable and combustible liquids should be stored outdoors remote from plant structures, or in isolated, detached buildings.**
4. **Flammable and combustible liquids should be stored in areas away from heavy motorized and pedestrian traffic, and away from congested work areas.**
5. **Flammable and combustible liquids cannot be stored directly adjacent to building exits, or in areas which could prevent orderly egress or evacuation from exits in an emergency.**
6. **All portable containers used to store flammable and combustible liquids must be capable of self-venting, to automatically dissipate internal pressure within the containers. Storage drums should be equipped with pressure relief bungs, and "end-use" containers should have spring loaded venting lids.**

7. **End-use portable containers should UL or FM approved safety cans, containing fill and dispensing spouts, flame arrestor screens, and spring loaded self-closing lids.**
8. **High piled storage quantities of flammable and combustible liquids must be stacked so as to be stable at all times, with adequate clearance between piles to allow for access at all times.**
9. **Large bulk quantities of flammable and combustible liquids must be stored in areas which contain adequate diking, drainage, and containment, to prevent spillage or leakage from communicating to adjacent areas or properties.**

18-3 TRANSFER AND DISPENSING

1. **All bulk dispensing containers of flammable and combustible liquids must be grounded to dissipate static voltages as fast as they are generated. Grounding must be accomplished by means of # 4 copper conductors terminating with approved grounding rods or underground cold water pipes.**
2. **Storage racks used to hold flammable and combustible liquids must be grounded. Such grounding should be achieved by a minimum $^{1/8}$ inch X ^{1} inch copper bus riveted to the storage rack, or by a cable-in-conduit system.**
3. **Each drum in a storage rack must be individually grounded. The fact that a metal container sits on a grounded metal rack is not a sufficiently sure contact to form an effective low-resistance ground.**
4. **When dispensing from drums into metal "end-use" containers, the drum must be bonded to the "end-use" container by a #4 copper conductor. The conductor should be attached to the drum and "end-use" container using ground clamps or spring ground clamps (alligator clamps). Drums and metallic "end-use" containers must be bonded together at all times to dissipate static electricity during liquid transfer.**
5. **Whenever possible, gravity transfer systems should not be used for the dispensing of flammable or combustible liquids, since the hazard of continued flow is present.**
6. **Liquid transfer should be made using UL listed or FM approved positive displacement pumps intended for use with flammable liquids. The pumps should offer a tight shut-off, and should prevent siphoning of the liquid when not in use.**

7. **Centrifugal dispensing pumps should be avoided whenever possible, as such pumps prevent tight shut-off and allow siphoning to occur.**
8. **Drum dispensing nozzles or spigots threaded into drums for liquid dispensing should be tightly engaged with the drum, and should have a spigot valve which shuts off all liquid flow when the valve is closed.**
9. **When liquid transfers are necessary, only small amounts should be handled in approved containers.**
10. **All containers of flammable and combustible liquids (including "end-use" containers") must be labeled with the appropriate designation of "flammable" or "combustible". Any liquid with a flash point of less than 100° F must have a "flammable" label.**
11. **Flammable and combustible substances are considered hazardous, and must not be handled until the appropriate Material Safety Data Sheets (MSDS) are reviewed to determine appropriate storage and handling procedures.**
12. **"End-use" containers for flammable and combustible liquid dispensing must be limited to a one day supply.**
13. **"No Smoking" signs must be posted in a conspicuous manner in all areas where flammable and combustible liquids are stored and handled.**
14. **Drip pans or liquid catch pans should be used for drums stored horizontally, to catch drips and excess flow during dispensing.**
15. **Spray application of flammable and combustible materials is not permitted within the plant. Spray applications must be conducted outdoors away from the structure and other personnel. Caution should be exercised to prevent overspray from striking structures, vehicles, and adjacent properties.**

CHAPTER 19
PROPANE/FUEL GAS SECTION

23-1 INTRODUCTION

Compressed fuel gases can be very dangerous due to the potential for sudden explosion or flash fire from accidental ignition, and from release of contents under extreme pressure. Proper control of ignition

sources, housekeeping, and storage and handling is vital to prevent personal injury and property damage.

23-2 VAPORIZER SYSTEM

1. **Ignition sources must be eliminated at all times during work around the vaporizer system.**
2. **Smoking is prohibited at all times in this area.**
3. **Before starting work in this area, leak checks must be conducted specifically as set forth in the user manual.**
4. **All electrical controls must be inspected for proper operation.**
5. **All water temperature switches must be checked for accuracy.**
6. **Valves must be opened and closed slowly at all times.**
7. **All start-up procedures must be read and followed carefully.**
8. **After the system is started, the following steps must be taken:**
    - **Slowly open the main gas line to the plant.**
    - **Slowly open one (1) propane valve in the plant.**
    - **After approximately three (3) to five (5) minutes slowly open the main propane valve in the plant.**
    - **After and additional three (3) to five (5) minutes has elapsed, slowly close the natural gas main to the plant.**
9. **To shut the system down, follow the above instructions in exact reverse.**

23-3 BOTTLE REFILLING STATION

1. **During refilling, extreme caution must be taken to prevent ignition sources from coming into contact with fuel gases (propane and natural gas).**
2. **Smoking is prohibited at all times in this area.**
3. **Inspections should be carefully conducted to detect leaks, cracked hoses, and damage valves.**
4. **All bottles to be filled must be placed firmly on the ground.**
5. **The filling nozzle must be securely connected to the bottle at all times prior to filling.**
6. **Slowly open the tank valve, fill valve, and then the main valve. After these valves have been carefully opened, the tank bleeder valve should be opened slightly.**
7. **After all valves have been opened, the pump should be turned on.**

8. **The bleeder valve should be closed immediately when liquid appears, and then the pump should be shut-off.**
9. **Slowly close the fill valve, main valve, and the tank valve.**
10. **The bleeder valve should be opened slowly on the filing nozzle to allow any entrapped gas to vent properly.**
11. **The filling nozzle should always be removed slowly, and should be properly replaced in the hanging position.**

NOTES